

## **REMARKS**

In response to the above-identified Final Office Action (“Action”), Applicant submits the following remarks and seeks reconsideration thereof. Claims 1-18 are pending in the present application. Claims 11-16 are withdrawn. Claims 1-10 and 17-18 are rejected. In this response, claims 1 and 17 are amended, claim 2 is cancelled and no claims are added.

### **I. Claim Amendments**

Applicant respectfully submits herewith amendments to claims 1 and 17. Claim 2 is cancelled. Claim 1 is amended to recite the elements of “the pipe having a composite reinforcement comprising a resin and reinforcement fibers coupled thereto; and heating the pipe to a temperature above a heat distortion temperature of the resin such that the composite reinforcement is heated to a temperature slightly below a heat distortion temperature of the composite reinforcement.” Thus, claim 1 is amended to incorporate elements previously recited in now cancelled claim 2 and amended claim 17. Claim 1 is further amended to recite that the pipe is heated to a temperature above a heat distortion temperature of the resin as described on page 3, paragraph [0012] continuing onto page 4 of the Application. Claim 17 is amended for consistency with the amendments to claim 1. Thus, the amendments do not add new matter and are supported by the specification.

Applicant respectfully submits that since the Examiner has previously examined the subject matter now recited in claim 1 relating to the heat distortion temperature of a composite reinforcement, the amendments to claim 1 do not require further search by the Examiner. As such, Applicant respectfully requests consideration and entry of the amendments to claims 1 and 17 after final.

## **II. Claims Rejected Under 35 U.S.C. §102**

In the outstanding Action, claims 1-4 and 7 are rejected under 35 U.S.C. §102(b) as being anticipated by U. S. Patent No. 4,132,104 issued to Clavin ("Clavin"). Applicant respectfully traverses the rejection.

It is axiomatic to a finding of anticipation that each and every element of the rejected claim be found within a single prior art reference.

Claim 2 is cancelled therefore the rejection of claim 2 on this basis is moot.

In regard to independent claim 1, Applicant respectfully submits that Clavin fails to teach at least the elements of "the pipe having a composite reinforcement comprising a resin and reinforcement fibers coupled thereto; and heating the pipe to a temperature above a heat distortion temperature of the resin such that the composite reinforcement is heated to a temperature slightly below a heat distortion temperature of the composite reinforcement" as recited in amended claim 1.

The Examiner alleges "applying a material to a pipe" as recited in col. 4, lines 43-59 of Clavin teaches a composite reinforced pipe and further that col. 1, line 57-col. 2, line 5 and Figure 1 teach heating the pipe prior to bending. See Action, page 2. The Examiner alleges that merely applying a material to a pipe teaches a composite reinforced pipe because a composite is something made up of distinct parts i.e. a pipe and coating. See Action, page 2. The Examiner further alleges that Clavin teaches heating the plastic coating to a temperature where the coating is softened but not destroyed and therefore teaches heating a pipe such that a composite temperature is slightly below a heat distortion temperature of the composite. See Action, pages 2, 8 and 9.

For at least the reasons discussed in the previous responses (see, for example, pages 6-7 of the Response to Office Action mailed February 13, 2008) neither a plastic coating alone nor a plastic coated pipe as disclosed in Clavin may be characterized as a composite reinforcement. Although Applicant maintains its disagreement with the Examiner that a plastic coated pipe is a

Composite Reinforced Pipe (CRP) because it includes distinct parts (i.e. plastic coating and pipe), Applicant has amended claim 1 to clarify that the composite referred to is a composite reinforcement having a resin and reinforcement fibers. The plastic coating of Clavin does not include a resin and reinforcement fibers therefore Clavin fails to teach this element. The failure of Clavin in this regard is further evidenced by the fact that the Examiner did not reject claim 17, which previously recited this element, in view of Clavin in the instant Action.

The failure of Clavin to disclose a composite reinforcement further prevents Clavin from teaching the element of “heating the pipe to a temperature above a heat distortion temperature of the resin such that the composite reinforcement is heated to a temperature slightly below a heat distortion temperature of the composite reinforcement.”

In particular, as discussed in the previous response (see, for example, page 7 of the Response to Office Action mailed February 13, 2008), it is well known that a heat distortion temperature of a material refers to a temperature at which the material deforms under a specific load and is determined by standardized testing procedures. Moreover, as evidenced by the documents titled “Deflection Temperature Testing of Plastics” (“the HDT paper”) submitted with the previous response, the heat distortion temperature of a material is specific to that material and is determined by more than a mere softening of the material. See for example, the paragraph following the figure on page 1 of the HDT which states that the “value obtained for a specific polymer grade will depend on the base resin and on the presence of reinforcing agents.”

Applicant further notes its disagreement with the Examiner’s characterization of that the caption of the figure on page 1 of the HDT paper as simply teaching that the heat distortion temperature occurs when sufficient bending occurs. See Action, page 8. Rather, the caption states that the “deflection temperature is the temperature at which a test bar, *loaded to the specified bending stress, deflects by 0.010 inch (0.25mm)*” (emphasis added). As indicated in the paragraph before the figure, the two common loads used are 0.46MPa and 1.8MPa. Thus the heat distortion temperature of a material is not simply the temperature at which it softens and bends as alleged by the Examiner.

Accordingly, an undisclosed temperature range which softens a plastic as discussed in col. 4, lines 65-68 of Clavin does not teach (1) the temperature for heating a pipe above a heat distortion temperature of a resin or (2) a temperature slightly below a heat distortion temperature of a composite reinforcement as recited in claim 1.

Since, for at least the foregoing reasons, Clavin fails to teach each and every element of claim 1, claim 1 is not anticipated by the cited prior art reference. Applicant respectfully requests reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. §102 over Clavin.

In regard to claims 3, 4 and 7 these claims depend from claim 1 and incorporate the limitations thereof. Thus, for at least the reasons that claim 1 is not anticipated by Clavin, claims 3, 4 and 7 are further not anticipated by the cited prior art reference. Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 3, 4 and 7 under 35 U.S.C. §102 over Clavin.

### **III. Claims Rejected Under 35 U.S.C. §103**

A. In the outstanding Action, claims 5 and 6 are rejected under 35 U.S.C. §103(a) as being unpatentable over Clavin as applied to claims 3 and 4, and further in view of European Patent Application 1 086 760 A2 by Lewis ("Lewis"). Applicant respectfully traverses the rejection.

To establish a *prima facie* case of obviousness, the Examiner must set forth "some articulated reasoning with some rational underpinning to support the conclusion of obviousness." See KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385, 1396 (2007). In combining prior art elements to render the claimed combination of elements obvious, the Examiner must show that the results would have been predictable to one of ordinary skill in the art. See Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103, Section III(D), issued by the U.S. Patent and Trademark Office on October 10, 2007.

Claims 5 and 6 depend from claim 1 and incorporate the limitations thereof. For at least the reasons previously discussed, Clavin fails to disclose or render predictable at least the elements of "the pipe having a composite reinforcement comprising a resin and reinforcement

fibers coupled thereto; and heating the pipe to a temperature above a heat distortion temperature of the resin such that the composite reinforcement is heated to a temperature slightly below a heat distortion temperature of the composite reinforcement” as incorporated into claims 5 and 6 from claim 1. The Examiner has further not pointed to, and Applicants are unable to discern, a portion of Lewis curing the deficiencies of Clavin with respect to these elements. Rather Lewis is relied upon by the Examiner to disclose bend increments achieved by a pipe bending machine. See Action, page 4.

Claim 5 is further not obvious over Clavin in view of Lewis for at least the reasons that Clavin and Lewis fail to disclose or render predictable the element of “wherein the longitudinally displaced locations are separated by a distance equal to approximately  $\frac{1}{4}$  of a diameter of the pipe” as further recited in claim 5.

The Examiner alleges Clavin teaches 1 degree bends achieved in an arc distance equal to a pipe’s diameter and Lewis discloses spaced  $\frac{1}{4}$  degree bends. See Action, pages 3-4. The Examiner alleges the foregoing disclosures teach spaced  $\frac{1}{4}$  degree bends which are  $\frac{1}{4}$  of the 1 degree arc length and therefore meet the limitations of claim 5. See Action, page 4. Applicant respectfully disagrees.

In particular, although Clavin discloses bending the pipe 1 degree per arc foot in col. 5, a mere teaching of a pipe bend degree per arc foot does not disclose longitudinally spacing the bends along the pipe based on a diameter of the pipe. Similarly, the portion of Lewis relied upon by the Examiner describes over bending of the pipe to  $\frac{1}{2}$  degree instead of  $\frac{1}{4}$  degree to achieve a  $\frac{1}{4}$  degree bend once the pipe is relaxed, not spacing bends along the pipe. See Lewis, col. 9, paragraph [0029]. Thus, these portions of Clavin and Lewis are concerned with the angle of the pipe bend, not where the bend is positioned along the pipe with respect to a pipe diameter. The degree of bend is not what is recited in claim 5. Rather claim 5 specifies that the distance between longitudinally displaced locations along the pipe is  $\frac{1}{4}$  of a diameter of the pipe. Accordingly, for at least these additional reasons the Examiner fails to identify a portion of either Clavin or Lewis disclosing or rendering predictable at least the element of longitudinally displaced locations separated by a distance equal to approximately  $\frac{1}{4}$  of a diameter of the pipe.

Since Clavin and Lewis fail to disclose each of the elements of claims 5 and 6, a *prima facie* case of obvious may not be established. Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 5 and 6 under 35 U.S.C. §103 in view of Clavin and Lewis.

B. In the outstanding Action, claims 8 and 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Clavin as applied to claim 1, and further in view of U.S. Patent No. 4,255,378 issued to Miller *et al.* ("Miller"). Applicant respectfully traverses the rejection.

Claims 8 and 10 depend from claim 1 and incorporate the limitations thereof. For at least the reasons previously discussed, Clavin fails to disclose or render predictable at least the elements of "the pipe having a composite reinforcement comprising a resin and reinforcement fibers coupled thereto; and heating the pipe to a temperature above a heat distortion temperature of the resin such that the composite reinforcement is heated to a temperature slightly below a heat distortion temperature of the composite reinforcement" as incorporated into claims 8 and 10 from claim 1. The Examiner has further not pointed to, and Applicants are unable to discern, a portion of Miller curing the deficiencies of Clavin with respect to these elements. Rather Miller is relied upon by the Examiner to disclose capping the ends of a plastic pipe. See Action, page 4.

Applicant further submits that there is no reason to modify Clavin in view of Miller to include the elements of "capping the pipe to prevent heat loss" (claim 8) and preheating the pipe by "introducing hot air into the CRP" (claim 10).

Clavin discloses a technique for bending a *metal* pipe without tearing a coating by *directly* heating the coating. Clavin does not contemplate *heating the pipe* prior to bending of the pipe as a way to prevent tearing of the coating much less a desire to retain heat within the pipe. Miller discloses a process for bending a *plastic* pipe wherein air is retained within the pipe using plugs at each end *so that pressurized air is trapped within the pipe to prevent pipe buckling during bending*. See Miller, col. 5, lines 22-29.

Nowhere within Miller is it contemplated that the trapped air facilitates heating of a coating or prevents tearing of an outer coating during bending of the pipe. Moreover, the reason for trapping pressurized air using plugs as disclosed in Miller (i.e. prevent buckling of plastic

pipe during bending) is entirely absent in Clavin. In particular, Clavin discloses a metal pipe. One of ordinary skill in the art would not understand trapping of pressurized air within a metal pipe to have any particular advantage with respect to pipe buckling. Accordingly, one of ordinary skill in the art would not understand any reason to introduce hot air into the metal pipe of Clavin or cap off the pipe ends to prevent heat loss.

Since Clavin and Miller fail to disclose each of the elements of claims 8 and 10, a *prima facie* case of obvious may not be established. Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 8 and 10 under 35 U.S.C. §103 in view of Clavin and Miller.

C. In the outstanding Action, claim 9 is rejected under 35 U.S.C. §103(a) as being unpatentable over Clavin as applied to claim 1, and further in view of U.S. Patent No. 2,480,774 issued to Rossheim *et al.* ("Rossheim"). Applicant respectfully traverses the rejection.

Claim 9 depends from claim 1 and incorporates the limitations thereof. For at least the reasons previously discussed, Clavin fails to disclose or render predictable at least the elements of "the pipe having a composite reinforcement comprising a resin and reinforcement fibers coupled thereto; and heating the pipe to a temperature above a heat distortion temperature of the resin such that the composite reinforcement is heated to a temperature slightly below a heat distortion temperature of the composite reinforcement" as incorporated into claim 9 from claim 1. The Examiner has further not pointed to, and Applicants are unable to discern, a portion of Rossheim curing the deficiencies of Clavin with respect to these elements. Rather Rossheim is relied upon by the Examiner to disclose the use of induction heaters and resistance heaters to bend a pipe. See Action, page 5. Since Clavin and Rossheim fail to disclose each of the elements of claim 9, a *prima facie* case of obvious may not be established. Applicant respectfully requests reconsideration and withdrawal of the rejection of claim 9 under 35 U.S.C. §103 in view of Clavin and Rossheim.

D. In the outstanding Action, claims 17 and 18 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,234,333 issued to Rhodes, Jr. *et al.* ("Rhodes") as applied to

claim 1, and further in view of U.S. Patent No. 4,559,974 issued to Fawley (“Fawley”). Applicant respectfully traverses the rejection.

Claims 17 and 18 depend from claim 1 and incorporate the limitations thereof. The Examiner has not pointed to, and Applicants are unable to discern, a portion of Rhodes and Fawley disclosing or rendering predictable a method of bending Composite Reinforced Pipe (CRP) including “placing a heater proximate to a longitudinal location along the pipe where the pipe is to be bent, the pipe having a composite reinforcement comprising a resin and reinforcement fibers coupled thereto; and heating the pipe to a temperature above a heat distortion temperature of the resin such that the composite reinforcement is heated to a temperature slightly below a heat distortion temperature of the composite reinforcement; and bending the pipe at the longitudinal location” as incorporated into claims 17 and 18 from claim 1. Rather Rhodes generally discloses a method for twisting or postforming a plastic rod without any particular disclosure of a temperature to which a pipe may be heated much less the heat distortion temperature of a resin or composite reinforcement. Fawley discloses a crack arrester for stopping a propagating ductile fracture.

The combination of Rhodes and Fawley may further not be relied upon to disclose the additional element of “wherein a number of longitudinal fibers is greater than a number of circumferential fibers” as recited in claim 18. The Examiner admits Rhodes and Fawley fail to disclose this element and instead alleges it would be an obvious modification for the purpose of minimizing labor and material costs. See Action, page 6. In particular, the Examiner alleges that Fawley teaches minimizing labor and material costs in col. 3, lines 4-11 and therefore recognizes that the amount of wrapped fibers is a result-effective variable. See Action, page 6. In referring to minimizing labor and material costs, however, Fawley is referring to placing a plurality of crack arrestors around an object to stop propagating ductile fracture as opposed to the prior art which utilized costly or labor intensive solutions such as heavy walled pipes, cables, concrete abutments, valves and metal sleeves. See Fawley, col. 2, lines 15-65. Fawley is not referring to modifying the number of longitudinal and circumferential fibers positioned around the pipe. Thus, the Examiner has not shown that Fawley recognized that the amount of wrapped fibers is a



result-effective variable and has therefore not shown that one of ordinary skill in the art would have understood any reason to modify Rhodes in view of Fawley to include a composite reinforcement having a greater number of longitudinal fibers than circumferential fibers as claimed.

Since Rhodes and Fawley fail to disclose or render predictable each and every element of claims 17 and 18, a *prima facie* obvious may not be established. Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 17 and 18 under 35 U.S.C. §103 in view of Rhodes and Fawley.

### CONCLUSION

In view of the foregoing, it is believed that all claims now pending, namely claims 1 and 3-18, are now in condition for allowance and such action is earnestly solicited at the earliest possible date. If there are any additional fees due in connection with the filing of this response, please charge those fees to our Deposit Account No. 02-2666. Questions regarding this matter should be directed to the undersigned at (310) 207-3800.

Respectfully submitted,

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#### **CERTIFICATE OF TRANSMISSION**

I hereby certify that this correspondence is being submitted electronically via EFS-Web to the United States Patent and Trademark Office on July 29, 2008.

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